Polar Axis Quick Adjusting Equatorial Type Telescope

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SPECIFICATION

Polar Axis Quick Adjusting Equatorial Type Telescope

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings show the present utility model, Fig. 1 being a partial longitudinal sectional side view of an equatorial with whose polar axis is equipped a small-sized telescope, Fig. 2 showing a cross line of an eyepiece lens thereof, and Fig. 3 showing a partial diagrammatic view of a relation between equatorial longitudes engraved on the cap of the eyepiece lens and the cross line.

DESCRIPTION OF THE UTILITY MODEL

The utility model relates to an equatorial type astronomical telescope equipped with a small-sized telescope on a hollow polar axis thereof capable of

providing reliable adjustment of the polar axis in the Polaris field. Most of refracting equatorials of the conventional 60mm class to 100mm class were equipped with a movable tripod or a pillar and carried outdoors for every observation, causing a disadvantage of requiring extreme skill to provide conformance with the polar axis every time an observation is made and expending waste time. An object of the utility model is to eliminate this and provide a convenient astronomical telescope capable of providing quick and easy conformance with the polar axis even for a layman. The utility model will be described by way of the drawings. In the drawings, numerals 1, 2, 3, 4, 5, 6, 7, 7',8, 8', 9, 10, 11, 12, 12', 13, 14 and 15 show a supporting base, polar axis body, angle adjusting apparatus, hollow polar axis, objective lens, eyepiece lens, visual field ring located in an eyepiece lens focus position, cross line tightened thereto, cap of the eyepiece lens, uniform scale divided into 24 parts engraved outside thereof, pointer, equatorial longitude warm wheel, equatorial longitude scale ring, equatorial latitude axis body, window hole thereof, hollow equatorial latitude axis, window hole thereof, equilibrium weight and cap removably fitted into the window hole 12' of the equatorial latitude axis body, respectively. In the

utility model, the polar axis body 2 is articulated to the support base 1 whose angle with the support base 1 is adjustable by means of the angle adjusting apparatus 3, in the polar axis body 2 is equipped with the hollow polar axis 4 which is combinedly used as a lens-barrel of the objective lens 5, and in the inside thereof is arranged the objective lens 5 and at a lower end thereof is equipped with the focus adjusting screw supporting the eyepiece lens 6 by a fitting. In the visual field ring 7 located at the focal point of the eyepiece lens 6, as shown in Fig. 2, the cross lint 7 is tightened and at the end of the eyepiece lens 6 is fixed the cap 8 on which is engraved the uniform scale 8' divided into 24 parts. The polar axis 4 is mounted and inserted through between the equatorial longitude warm wheel 10 and equatorial longitude scale ring 11 and fixed to the equatorial latitude axis body 12. In the equatorial latitude axis body 12 is drilled a pair of window holes 13' which are equipped with the hollow equatorial latitude axis 13 and transmits light to the objective lens 5 centering around the polar axis extension line 4, in the window hole 12 of the equatorial latitude axis body 12 is fitted a removal cap 15 and at the lower end of the equatorial latitude axis body 12 is added by the equilibrium weight 14. In the

visual field ring 7, as shown in Fig. 2, lines A-A' and B-B' intersect at a right angle with each other and intersection 0 is located at the center of a visual field. Furthermore, line C-C' is given parallel retaining distance ℓ against line A-A'. ℓ is obtained by

$$\ell = \frac{of \times 3300}{206000} \text{ m/m}$$

assuming that a focal distance of the objective lens 5 is of m/m and an interval from the Polaris to the true north pole is 3.300 seconds. With a use of an objective lens of 90 m/m,

$$\frac{90 \times 3300}{206000} = 1.5 \text{ m/m}$$

is obtained and setting is made according to this value.

Fig. 3 shows a relational position between a scale engraved on the outer side of the eyepiece lens cap 8 and the cross line 7' comprising lines A-A', B-B' and C-C' of the visual field ring, and on the outer circumference thereof are provided with engraved lines equally divided into 24 parts every 1 h, line B-B' of cross line 7' is fixed parallel to 2h-14h and point P is set on the 14h side.

The constitution of the utility model being as stated above, in order to provide a conformance of the polar axis

of the equatorial, first the polar axis is generally directed to the north and and watch the sky in the north by means of the eyepiece lens 6 by setting the telescope to a 4× to 6 × magnification and the Polaris immediately comes into a visual field due to a wide field of view. For ordinary observation purposes, setting the Polaris so as to come to visual field center point 0 suffices; however, when further precision is required, a sidereal time corresponding to the observation time is obtained from the astronomical chronology, the sidereal time is set to the pointer 9 by rotating the cap 8 fixed to the eyepiece lens 6 and an angular direction is moved so that the Polaris comes to point P, thus permitting the true north pole to come to intersection 0. In this case, point P is located, not in a direction of 2h, a slippage of the Polaris in a equatorial longitude direction, but on a 14h side opposite thereto is because the eyepiece lens indicates, not an electing system, but an inverted image.

As stated above, the utility model is practically effective in the provision of a polar axis quick adjusting telescope equipped equatorial capable of adjusting the polar axis at a precision comparative to the Polaris field photography with ease even by ordinary people who have no knowledge of a method of conforming the polar axis, i.e.,

a method in which an error in a reading of the scale line is minimized on the east and west sides of the supporting base by means of bright stars whose equatorial longitude and equatorial latitude in the south sky and east sky are known.

WHAT IS CLAIMED IS:

A structure of a polar axis quick adjusting equatorial type telescope having a hollow polar axis 4 equipped, as shown in the figure, in a polar axis body 2 raisably pivotally supported to a supporting base 1 by means of an angle adjusting apparatus 3, wherein in the interior an objective lens 5, and at the lower end thereof an eyepiece lens 6 are inserted on a focus adjustable basis, line C-C' is provided therein at a right angle to 2 fine lines comprising lines A-A' and B -B' tightened parallel to each other by retaining a distance corresponding to an angular distance between the true north pole and the Polaris, a visual field ring 7 indicating points O and P being interior arranged, point P being set and fixed parallel to a scale 2h or 14h of a cap 8 engraved a line divided into 24 uniform parts 8, and a window holes 12' and 13' are drilled on an optical axis extension 4' of an equatorial latitude axis body 12 and a hollow equatorial latitude axis 13.

FIG. 1

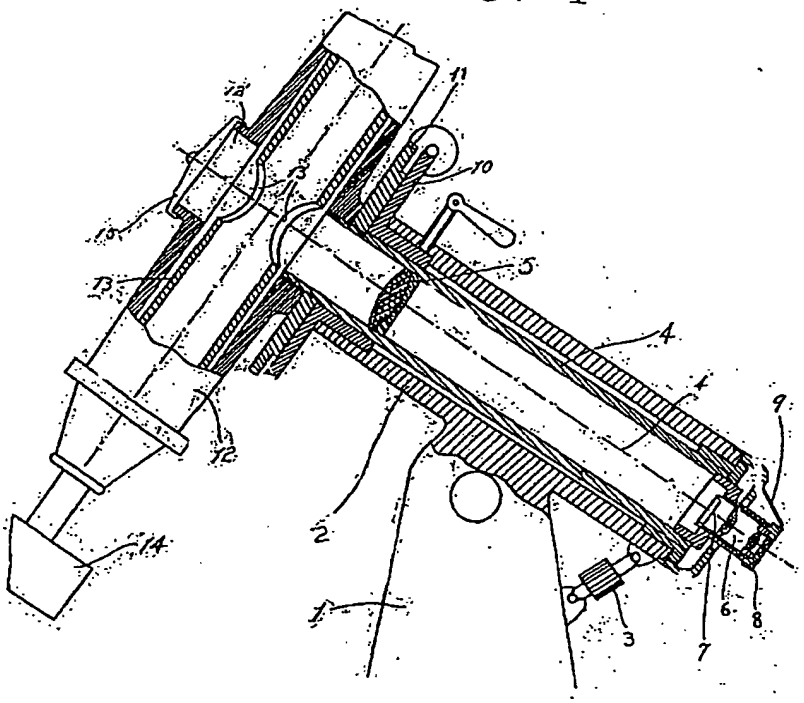


FIG. 2

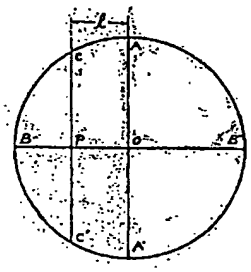
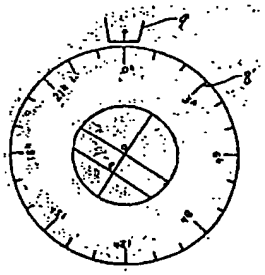


FIG. 3



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特許庁

実用新案出願公告

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（全2頁）

極軸速調赤道儀型望遠鏡

図面の略解

図面は本実用新案を示すもので第1図は赤道儀の極軸に小望遠鏡を装着せる状態の一部縦断側面図第2図はその接眼鏡の十字線を示し、第3図は接眼鏡のキャップに刻設した赤経目盛と十字線との関係を示す部分図を示す。

実用新案の説明

本実用新案は中空極軸に小型望遠鏡を装着し、北極星野にて正確な極軸の調整を行い得る様にした赤道儀式天体望遠鏡に係り従来の60㎜乃至100㎜級の屈折赤道儀は大半移動式の三脚又はピラーを持ち観測の度毎に屋外へ搬出して使用するのであるが極軸をその都度合致させるのに非常な熟練と手数を要し従つて観測前に無駄な時間を空費する欠点があつたのを本実用新案はこれを排除して素人にても迅速且容易に極軸を合致させることの出来る便利なものを提供しようとするものである。図面について本実用新案を説明すると図中1は支持台、2は極軸体、3は角度調整装置、4は中空極軸、5は対物レンズ、6は接眼鏡、7は接眼鏡焦点位置にある視界環で7'はこれに張られた十字線、8は接眼鏡のキャップ8'はその外側に刻設した24等分目盛、9は指針、10は赤経ウオームホイール、11は赤経目盛環12は赤緯軸体 12' はその窓孔、13は中空赤緯軸 13' はその窓孔、14は平衡重錘15は赤緯軸体の窓孔 12' に嵌脱自在に被嵌するキャップを示すもので、本実用新案は支持台1に極軸体2を軸着し角度調整装置3により支持台1との角度を自在に調整し得るもので極軸体2内には中空極軸4を内装して対物レンズ5の鏡筒をも兼用させて内側は対物レンズ5を設置しその下端には焦点調整ネジは金具を以て接眼鏡6を支持して装設する、接眼鏡6の焦点位置にある視界環7には第2図示のように十字線7を張設明示し接眼鏡6の端部にはキャップ8を被嵌固定してこれに24等分の目盛8'を刻設する極軸4には赤経ウオームホイール10赤経目盛環11を挟着貫挿して赤緯軸体12に固定されている。赤緯軸体12内には中空赤緯軸13を内装して極軸延長線4を中心に対物レンズ5に光を透過する一双の窓孔13'を穿設し赤緯軸体12の窓孔 12' には嵌脱自在のキャップ15を被嵌し又赤緯軸体12の下端には平衡重錘14を附設して形成される。視界環7は第2図に示すようにA—A'線、B—B'線は直角に交叉し交点0は視界中央に位置され更にC—C'線をA—A'線に ℓ なる間隔を保持して平行に張設してあり ℓ は対物レンズ5の焦点距離を of ㎜ 北極星より真北極までの間隔を3.300秒として

$$\ell = \frac{of \times 3300}{206000}\ ㎜$$ にて得られるものであつて

今 90 ㎜の対物レンズを用いるならば

$$\frac{90 \times 3300}{206000} = 1.5\ ㎜$$ となるからこの数値に従つて設定されるものである

第3図に示すものは接眼鏡キャップ8の外側に刻設した目盛と視界環のA—A'、B—B'、C—C'線より成る十字線7'との関係位置を示すもので、その外周を1h毎に24等分の刻線を設け十字線7'のB—B'線を2h～14h に平行に固定してP点を14h 側に設定したものである。

本実用新案は上記のように構成されているので赤道儀の極軸を合致させるには、先ず大体北に極軸を向けて接眼鏡6により北天を窺視するとこの際望遠鏡の倍率を4乃至6倍として置けば広視界であるため直ちに北極星が視野に入る。通常の観測目的には北極星を視界中央0点に来る如く合せて置けば充分であるが、更に精密を要する場合にはその観測時に当る恒星時を天文年表より求め接眼鏡6に固定されたキャップ8を回転させて指針9に恒星時を合せP点に北極星が来るように角度方向を移動させれば真の北極が交点0に来ることになるこの際P点を北極星の赤経方向のずれ2h方向にせず反対側の14h 側にしたのは接眼鏡が正立

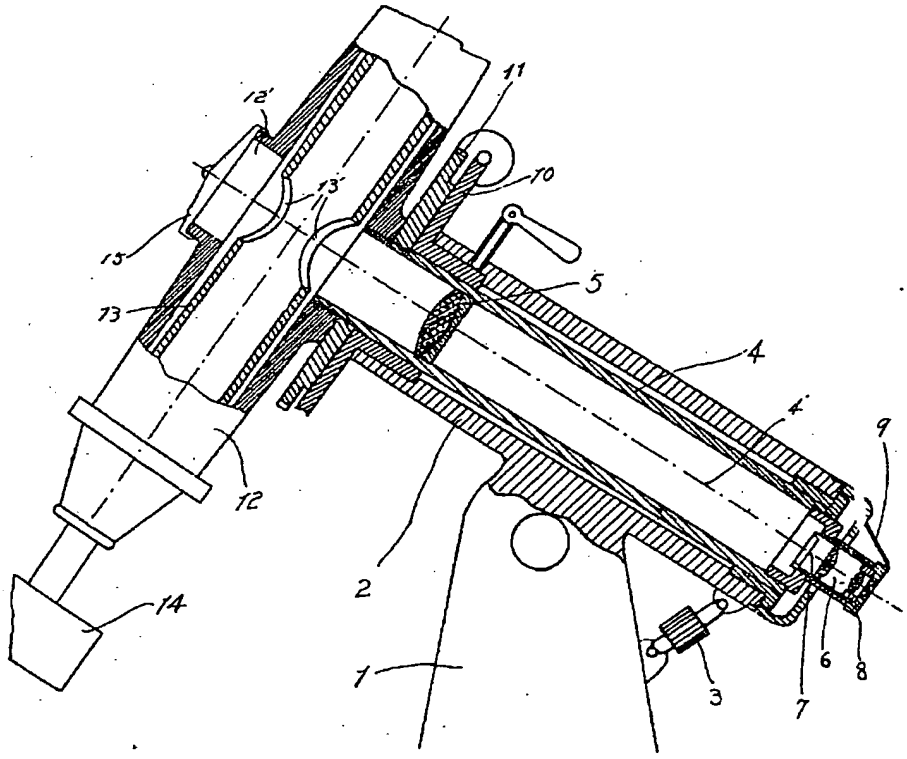
系でなく倒立像を示す為に反対側としたものである。

本実用新案は上述のように通常極軸を合せる方法即ち南天及東天等の赤経赤緯の知られたる輝星により目盛線の読みを支持台の東西側にて誤差最小となす方法等を知らない素人にも容易に北極星野写真法に匹敵する確度にて極軸調整を行い得られる極軸速調望遠鏡付赤道儀を提供し得る実用上有効な考案である。

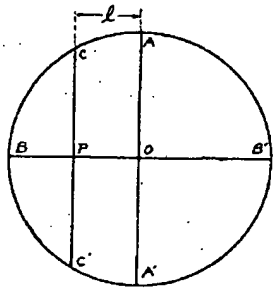
登録請求の範囲

図面に示すように支持台1に角度調整装置3にて起伏自在に軸支された極軸体2内に中空極軸4を内装し内部に対物レンズ5とその下端に焦点調整自在に接眼鏡6を挿入しこれに真北極と北極星との角距離に相当する間隔を保持してA—A'、B—B'線を平行に張りたる二本の細線と直角にC—C'線を設けてOP点を指示した視界環7を内装設置し24等分線8を刻接したキャップ8の目盛9h又は14hに平行にP点を設定して固定し赤緯軸体12と中空赤緯軸13にその光軸延長線4'上に窓孔12'と13'を穿設して成る極軸速調赤道儀型望遠鏡の構造。

第1図



第2図



第3図